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EXAMINER	
PARAS JR,P	
ART UNIT	**PAPER NUMBER**
1632	9

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Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

File

Office Action Summary	Application No.	Applicant(s)	
	09/498,537	BUELOW, JENULRICH	
	Examiner	Art Unit	
	Peter Paras, Jr.	1632	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

Status

1)☐ Responsive to communication(s) filed on *05 October 2000* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-32* is/are pending in the application.

4a) Of the above claim(s) *20-25* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-19, and 26-32* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

a)☐ All b)☐ Some * c)☐ None of the CERTIFIED copies of the priority documents have been:

1.☐ received.

2.☐ received in Application No. (Series Code / Serial Number) _____ .

3.☐ received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☒ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. & 119(e).

Attachment(s)

15) ☒ Notice of References Cited (PTO-892)
16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
17) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *5-6* .
18) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
19) ☐ Notice of Informal Patent Application (PTO-152)
20) ☐ Other: .

DETAILED ACTION

Election/Restrictions

Applicant's election with traverse of Group I, claims 1-19, and 26-32 in Paper No. 8 is acknowledged. The traversal is on the ground(s) that the Examiner has not shown that the inventions are independent and distinct. In particular, Applicants submit that it would not have been undue to search the claims of Group I and Group II, since they are clearly related and not independent. This is not found persuasive because it is maintained that each of the Inventions require a separate search status. In particular, Group I is directed a transgenic animal, methods of making the same transgenic animal, and polyclonal antisera produced by the same transgenic animals. As such the products and methods of Group I require materially different reagents and technical considerations than methods of *in vivo* treatment employing the polyclonal antisera Group II. Further, the Invention of Group I may be used in materially different methods than the methods of Group II. For example, the polyclonal antisera of Group I may be used to detect an antigen in an *in vitro* assay. Therefore, it is maintained that these inventions are distinct due to their divergent subject matter (polyclonal anitsera, transgenic animals and methods of making the same, methods of *in vivo* treatment using the polyclonal antisera, etc.) and are thus, separately classified and searched. The requirement is still deemed proper and is therefore made **FINAL**.

Claim Rejections - 35 USC § 112, 1st paragraph

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> **The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.**

Claims 11-18, and 26-32 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a transgenic rabbit comprising a portion of functional human heavy chain immunoglobulin genes wherein the portion of functional heavy chain immunoglobulin genes comprises at least one constant region and further comprises at least one variable region wherein said variable region element is the variable region element proximal to the D region; a transgenic rabbit comprising at least a portion of functional human light chain immunoglobulin genes wherein the immunoglobulin light chain encodes the κ chain; and methods of producing the same transgenic rabbits, and a transgenic mouse comprising the same transgenes respectively; and methods of producing the same transgenic mice comprising targeting by homologous recombination in embryonic stem cells does not reasonably provide enablement for any and all transgenic non-human animals comprising any and all functional heavy chain immunoglobulin genes and any and all functional light chain immunoglobulin genes, and methods of making the same transgenic animals. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the invention commensurate in scope with these claims.

Claim 11 is directed to a transgenic non-human animal weighing at least 1 kg and comprising at least a portion of functional human heavy chain immunoglobulin genes such that said transgenic animal predominantly produces functional, substantially human antibody molecules. Claim 12 is directed to a transgenic non-human animal weighing at least 1 kg and comprising at least a portion of functional human light chain immunoglobulin genes. Claim 13 is directed to the transgenic animal of claim 11 wherein the antibody diversity is generated by gene conversion. Claim 14 is directed to the transgenic animal of claim 11 wherein the animal is from the order of *Lagomorpha*. Claim 15 is directed to the transgenic animal of claim 11 wherein the portion of functional human heavy chain immunoglobulin genes comprises at least one constant region element. Claim 16 is directed to the same transgenic animal wherein the portion of functional human heavy chain immunoglobulin genes further comprises at least one variable region element. Claim 17 is directed the same transgenic animal wherein the variable region element is the variable region element proximal to the D region. Claim 18 is directed to the transgenic animal of claim 12 wherein said human immunoglobulin light chain gene encodes the k chain. Claim 26 is directed to a method of producing transgenic non-human animal, comprising human immunoglobulin genes, by nuclear transfer wherein said transgenic animal produces substantially human antibody molecules. Claim 27 is directed the same method. Claim 28 is directed to the same method wherein the nuclear transfer unit cell is an oocyte. Claim 29 is directed to the same method wherein the animal is from the order of Lagomorpha. Claim 30 is directed to the

same method wherein the heavy chain locus comprises at least one constant region element. Claim 31 is directed the same method wherein the heavy chain locus comprises at least one variable region element. Claim 32 is directed tot he same method wherein the heavy chain locus comprises the variable region element proximal to the D region.

The specification discusses that the invention features an animal model which can produce humanized antibodies. See page 4, 1st paragraph. The specification discusses that the invention features transgenic Dutch Belton rabbits comprising human immunoglobulin gene locus elements and produced by nuclear transfer (see pages 11-12) wherein said rabbits were immunized with the Hepatitis B surface antigen (HBsAg) such that humanized antibodies that recognize HbsAg are produced (see page 12). While the specification provides extensive teachings pertaining to the production of transgenic rabbits comprising human immunoglobulin gene locus elements introduced by homologous recombination in embryonic fibrolbasts the specification fails to provide any relevant teachings or specific guidance with regard to the generation of any and all transgenic non-human animals comprising human immunoglobulin gene locus elements introduced by homologous recombination in embryonic fibroblasts, in particular an animal which expresses the transgene such that a phenotype of producing humanized antibodies occurs (as is consistent with the discussion of the specification). Thus, as enablement requires the specification to teach how to make and use the claimed invention, the specification fails to enable the production of any and all transgenic non-human animals, other than a transgenic

rabbit comprising human immunoglobulin sequences introduced by homologous recombination in embryonic fibroblasts and a transgenic mouse comprising human immunoglobulin sequences introduced by homologous recombination in embryonic stem cells, that have a phenotype of producing humanized antibodies.

[**Note** that although the claimed transgenic animal is not limited to expression of the transgene at a level resulting in a phenotype, with regard to claim breadth, the standard under 35 U.S.C. §112, first paragraph, entails the determination of what the claims recite and what the claims mean as a whole. In addition, when analyzing the enabled scope of the claims, the teachings of the specification are to be taken into account because the claims are to be given their broadest reasonable interpretation that is consistent with the specification. As such, the broadest reasonable interpretation of the claimed transgenic non-human animal that comprises human immunoglobulin gene elements is one that expresses the human immunoglobulin gene elements at a level sufficient to result in a phenotype of producing humanized antibodies *(i.e.*, it is unknown what other purpose the transgenic animal would serve if the human immunoglobulin gene elements are not expressed at a sufficient level for a resulting phenotype of humanized antibody production).]

As the specification fails to provide any relevant teachings or guidance with regard to the production of any and all transgenic animals, other than a transgenic rabbit or a transgenic mouse, as claimed, one of skill would not be able to rely on the state of the transgenic art for an attempt to produce transgenic animals that comprise and express human immunoglobulin gene elements such

that humanized antibodies are produced. This is because the state of the art of transgenics is not a predictable art with respect to transgene behavior and the resulting phenotype. While the state of the art of transgenics is such that one of skill in the art would be able to produce transgenic animals comprising a transgene of interest; it is not predictable if the transgene would be expressed at a level and specificity sufficient to cause a particular phenotype. For instance, the level and specificity of expression of a transgene as well as the resulting phenotype of the transgenic animal are directly dependent on the specific transgene construct. The individual gene of interest, promoter, enhancer, coding, or non-coding sequences present in the transgene construct, the specificity of transgene integration into the genome, for example, are all important factors in controlling the expression of a transgene in the production of transgenic animal which exhibits a resulting phenotype. This observation is supported by Wáll (Theriogenology, 1996) who states that "[o]ur lack of understanding of essential genetic control elements makes it difficult to design transgenes with predictable behavior." See page 61, last paragraph. See also Houdebine (Journal of Biotechnology, 1994) who discloses that in the field of transgenics, constructs must be designed case by case without general rules to obtain good expression of a transgene (page 275, column 1, 1st paragraph); *e.g.*, specific promoters, presence or absence of introns, *etc.* As such guidance is lacking in the instant specification, it fails to feature any correlation between the expression of human immunoglobulin gene elements in any host animal, and,

thus, a specific resulting phenotype, namely the production of humanized antibodies.

Furthermore, without evidence to the contrary, transgene expression in different species of transgenic non-human animals is not predictable and varies according to the particular host species, and specific promoter/gene combination(s). This observation is specifically supported by Hammer et al. (Journal of Animal Science, 1986) who report the production of transgenic mice, sheep and pigs; however only transgenic mice exhibited an increase in growth due to the expression of the gene encoding human growth hormone (pages 276-277, Subsection: Effect of Foreign GH on Growth). The same transgene construct in transgenic pigs and sheep did not cause the same phenotypic effect. See also Ebert et al. (Molecular Endocrinology, 1988). This observation is supported by Mullins et al. (Journal of Clinical Investigations, 1996) who report on transgenesis in the rat and larger mammals. Mullins et al. state that "a given construct may react very differently from one species to another." See page S39, Summary. Wall et al. report that "transgene expression and the physiological consequences of transgene products in livestock are not always predicted in transgenic mouse studies." See page 62, first paragraph. Kappel et al. (Current Opinion in Biotechnology, 1992) disclose the existence of inherent cellular mechanisms that may alter the pattern of gene expression such as DNA imprinting, resulting from differential CpG methylation (page 549, column 2, 3rd full paragraph). Strojek and Wagner (Genetic Engineering, 1988) pointed out that a high degree of expression of a transgene in a mouse is often not predictive

of high expression in other species, including pigs and rabbits, because, for example, the cis acting elements may interact with different trans-acting factors in these other species (paragraph bridging pages 238-239). Given such species differences in the expression of a transgene, particularly when taken with the lack of guidance in the specification for the production of any and all non-human transgenic animals comprising human immunoglobulin gene elements, it would have required undue experimentation to predict the results achieved in any one host animal, other than a transgenic rabbit, comprising and expressing human immunoglobulin gene elements, the levels of the expression product, the consequences of that production, and therefore, the resulting phenotype of producing humanized antibodies.

This finding is also based on the unpredictable state of the transgenic knockout art in that disruption of a different exon of the same gene may not result in the anticipated phenotype as the claims are directed to gene targeting by homologous recombination in embryonic stem cells. See Moreadith et al. (Journal of Molecular Medicine, 1997) who support phenotypic unpredictability in knockout mice. In particular, Moreadith et al. discuss that gene targeting at a particular loci is unpredictable with respect to the resulting phenotype since often the generation of knockout mice, in many instances, changes the prevailing notions regarding the functions of the encoded proteins. For example, Moreadith et al. report that gene targeting at the endothelin loci led to the creation of mice with Hirschsprung's disease instead of the anticipated phenotype (abnormal control of blood pressure). Also Moreadith teach that true ES cells only exist in

the mouse. See page 208, column 2, 2nd paragraph. See also Moens et al. (Development, 1993) who report the importance of generating different mutations at a given locus to elucidate fully the function of a particular gene during development (page 485, Abstract).

Therefore, in view of the quantity of experimentation necessary to determine the parameters listed above for the production of any and all transgenic non-human animals comprising human immunoglobulin gene elements that can produce humanized antibodies, the lack of direction or guidance provided by the specification for the production of any and all transgenic animals expressing human immunoglobulin gene elements such that the animal can produce humanized antibodies, the absence of working examples for the demonstration or correlation to the production of a transgenic animal expressing human immunoglobulin gene elements for use of the animal to produce humanized antibodies, in particular when the human immunoglobulin gene elements are under the control of any and all promoters, and more particularly when the expression of the human immunoglobulin gene elements must occur at a level resulting in the production of humanized antibodies, the unpredictable state of the art with respect to transgene behavior in transgenic animals of any and all species, the undeveloped art pertaining to the establishment of true embryonic stem (ES) cells of animal species other than mouse, and the breadth of the claim drawn to any and all animals and the breadth of the claims drawn to any and all animals it would have required undue

experimentation for one skilled in the art to make and/or use the claimed invention.

Claim Rejections - 35 USC § 112, 2nd paragraph

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims1-19 and 26-32 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites language that is vague and indefinite. For example, the phrases "predominantly of substantially", "at least a portion of" (also recited in claims 2, 5-6), and "substantially human immunoglobulin" do not convey a clear meaning. With regard to the phrase "predominantly of substantially" it is not clear how much of the antisera is actually humanized. Furthermore "substantially human" does not indicate how much of the antibody molecule is human and how much is non-human, which is important regard to antibody therapy when assessing the immune response of a host receiving said therapy. With regard to the phrase "at least a portion of" it is unclear if all portions of human immunoglobulins are capable of antigen recognition. Claims 2-10 depend from claim 1. Correction is required.

Claim 2 recites the limitation "transgenic" in line 1. There is insufficient antecedent basis for this limitation in the claim.

Claim 11 recites language that is vague and indefinite. For example, the phrases "at least a portion of" (also recited in claim 12), "portion of"(also recited in claims 15-16), "substantially human" (also recited in claim 12), "at least in part", and " predominantly produces" do not convey a clear meaning. With regard to the phrase "predominantly produces" it is not clear how much of the antisera is actually humanized. Furthermore "substantially human" does not indicate how much of the antibody molecule is human and how much is non-human, which is important with regard to antibody therapy when assessing the immune response of a host receiving said therapy. With regard to the phrase "at least a portion of" it is unclear if all portions of human immunoglobulins are capable of antigen recognition. Claims 13-19 depend from claim 11. Correction is required.

Claim 26 recites language that is substantially vague and indefinite. The phrases "substantially human" (also recited in claim 27) and "substantially incapable of" (also recited in claim 27) do not convey a clear meaning. The phrase "substantially human" does not indicate how much of the antibody molecule is human and how much is non-human, which is important with regard to antibody therapy when assessing the immune response of a host receiving said therapy. The phrase "substantially incapable of" does not indicate how much endogenous antisera is made with regard to the purity of the polyclonal antisera. Claims 28-32 depend from claim 26. Correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> **A person shall be entitled to a patent unless –**
>
> **(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.**

Claims 1-10 are rejected under 35 U.S.C. 102(e) as being anticipated by Lonberg et al (filed 14 Feb., 1997, US 5,874,299).

Claim1 is directed to a polyclonal antisera composition of a nonhuman animal that comprises immunoglobulin molecules that are substantially human and bind specifically to an antigen. Claims 2-4 are directed to same polyclonal antisera and further describe the transgenic non-human animal that produces said antisera. Claim 5 is directed to the same polyclonal antisera wherein the heavy chain immunoglobulin genes comprise at least one constant region element. Claim 6 is directed to the same polyclonal antisera wherein the heavy chain immunoglobulin genes further comprise at least one variable region element. Claim 7 is directed to the same polyclonal antisera wherein the variable region element is proximal to the D region. Claim 8 is directed to the same polyclonal antisera wherein the immunogen comprises a disease causing organism or antigenic portion thereof. Claim 9 is directed to the same polyclonal antisera wherein the immunogen is an antigen endogenous to humans. Claim 10 is directed to the same polyclonal antisera wherein the immunogen is an antigen exogenous to humans. Claim 19 is directed to antisera produced by a transgenic animal.

Note, Claims 2-4, and 19 are product by process claims in which the embodiments of the transgenic animal that produces the polyclonal antisera carries little patentable weight. Patentability of a product-by-process claim is determined by the novelty and nonobviousness of the claimed product itself without consideration of the process for making it, or as in the instant case the characteristics of the transgenic animal that produces said polyclonal antisera, which is recited in the claims. *In re Thorpe*, 227 USPQ 964 (Fed. Cir. 1985).

Lonberg et al teach the production of polyclonal antisera that comprises at least a portion of the human heavy chain polypeptide wherein the portion of the human heavy chain polypeptide comprises at least one constant region element and one variable region element. Lonberg et al teach a polyclonal antisera that can recognize any immunogen. See whole document.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> **(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.**

Claims 11-18, and 26-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lonberg et al (filed 14 Feb., 1997, US 5,874,299) taken with

Brem et al (17 June, 1997, US 5,639,457), and Stice et al (Theriogenology, 1998, 49: 129-138).

Claim 11 is directed to a transgenic non-human animal weighing at least 1 kg and comprising at least a portion of functional human heavy chain immunoglobulin genes such that said transgenic animal predominantly produces functional, substantially human antibody molecules. Claim 12 is directed to a transgenic non-human animal weighing at least 1 kg and comprising at least a portion of functional human light chain immunoglobulin genes. Claim 13 is directed to the transgenic animal of claim 11 wherein the antibody diversity is generated by gene conversion. Claim 14 is directed to the transgenic animal of claim 11 wherein the animal is from the order of *Lagomorpha*. Claim 15 is directed to the transgenic animal of claim 11 wherein the portion of functional human heavy chain immunoglobulin genes comprises at least one constant region element. Claim 16 is directed to the same transgenic animal wherein the portion of functional human heavy chain immunoglobulin genes further comprises at least one variable region element. Claim 17 is directed the same transgenic animal wherein the variable region element is the variable region element proximal to the D region. Claim 18 is directed to the transgenic animal of claim 12 wherein said human immunoglobulin light chain gene encodes the k chain. Claim 26 is directed to a method of producing transgenic non-human animal, comprising human immunoglobulin genes, by nuclear transfer wherein said transgenic animal produces substantially human antibody molecules. Claim 27 is directed the same method. Claim 28 is directed to the same method wherein the

nuclear transfer unit cell is an oocyte. Claim 29 is directed to the same method wherein the animal is from the order of Lagomorpha. Claim 30 is directed to the same method wherein the heavy chain locus comprises at least one constant region element. Claim 31 is directed the same method wherein the heavy chain locus comprises at least one variable region element. Claim 32 is directed tot he same method wherein the heavy chain locus comprises the variable region element proximal to the D region.

Note, claims 11-18 are product by process claims in which the process of making the transgenic non-human animal carries little patentable weight. Patentability of a product-by-process claim is determined by the novelty and nonobviousness of the claimed product itself without consideration of the process for making it, which is recited in the claims. *In re Thorpe*, 227 USPQ 964 (Fed. Cir. 1985).

Lonberg et al teach transgenic mice that comprise human immunoglobulin heavy chain regions, particularly the constant and variable regions. Lonberg et al also teach transgenic mice that comprise human immunoglobulin light chain regions, particularly the κ chain region. See columns 18-30 and figures 25-26 for a description of the transgenes of Lonberg et al, and examples 1-23 for a description of the transgenes and mice of Lonberg et al. Lonberg et al further describe cross-breeding of mice comprising human immunoglobulin heavy chain regions and mice comprising human immunoglobulin light chain regions. See columns 29-30.

Lonberg et al do not teach transgenic rabbits or methods of making transgenic rabbits by nuclear transfer.

However at the time the claimed invention was made, Brem et al teach transgenic rabbits that comprise human immunoglobulin heavy chain regions, particularly the variable and constant regions. Brem et al made the transgenic rabbits by pronuclear injection. Stice et al teach that methods of cloning animals (sheep, cattle, pigs, mice, and rabbits) were known in the art. See page 130. Stice et al discuss the production of cloned, transgenic animals using targeting constructs that have been injected into the donor cell nucleus which can be either embryonic fibroblasts or embryonic stem cells depending on the animal of interest. See pages 133-135. Stice et al discuss that any gene of interest may be introduced or knocked out in the donor nucleus prior to transfer.

Accordingly, in view of the teachings of Brem et al and Stice et al, it would have been obvious for one ordinary skill in the art, at the time the claimed invention was made, to modify the teachings of Lonberg et al by creating cloned, transgenic rabbits that comprise human immunoglobulin heavy and light chain regions with a reasonable expectation of success. One of ordinary skill would have been sufficiently motivated to make such modifications as it was an art recognized goal to produce humanized antibodies in a transgenic non-human animal.

Thus, the claimed invention, as a whole, is clearly *prima facie* obvious in the absence of evidence to the contrary.

Conclusion

No claims are allowed.

Any inquiry concerning this communication or earlier communications from the examiner(s) should be directed to Peter Paras, Jr., whose telephone number is 703-308-8340. The examiner can normally be reached Monday-Friday from 8:30 to 4:30 (Eastern time).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Karen Hauda, can be reached at 703-305-6608. Papers related to this application may be submitted by facsimile transmission. Papers should be faxed via the PTO Fax Center located in Crystal Mall 1. The faxing of such papers must conform with the notice published in the Official Gazette, 1096 OG 30 (November 15, 1989). The CM1 Fax Center numbers are (703)308-4242 and (703)305-3014.

Inquiries of a general nature or relating to the status of the application should be directed to Kay Pinckney whose telephone number is (703) 305-3553.

Peter Paras, Jr.

Art Unit 1632

JILL D. MARTIN
PATENT EXAMINER